

CLAIMS

We claim:

1. A valve assembly that is suitable to dispense a chemical from an aerosol container that has a first region with a gas propellant and a second region with an active chemical, the valve assembly being of the type that can automatically iterate between an accumulation phase where the gas propellant is received from the container, and a spray phase where the active chemical is automatically dispensed at intervals, the valve assembly comprising:

a housing mountable on an aerosol container;

a movable diaphragm associated with the housing and being biased towards a first configuration, wherein the diaphragm is linked to a stem to move therewith, wherein the stem carries a seal surface and defines a valve outlet, and wherein the seal surface prevents active chemical from flowing through the valve outlet when the diaphragm is in the first configuration;

an accumulation chamber inside the housing for providing variable pressure against the diaphragm;

a first passageway in the housing suitable for linking the first region of the aerosol container with the accumulation chamber;

a second passageway linking the second region with the valve outlet;

whereby when the pressure of gas propellant inside the accumulation chamber exceeds a specified threshold the diaphragm can move to a second configuration where the seal surface is translated to permit active chemical to spray from the valve assembly.

2. The valve assembly as recited in claim 1, wherein the valve stem is hollow and includes a first end that defines the seal surface and a second end that defines the valve outlet.

3. The valve assembly as recited in claim 2, wherein the stem in-part defines an outer surface that provides a conduit from the accumulation chamber for the outlet of propellant from the valve assembly.

4. The valve assembly as recited in claim 1, wherein the seal surface is translated in a direction away from the container to permit active chemical to spray from the valve assembly.

5. The valve assembly as recited in claim 1, wherein a porous material is disposed within the first passageway to regulate the flow rate of gas propellant there through.

5 6. The valve assembly as recited in claim 1, wherein the diaphragm will shift back to the first configuration from the second configuration when pressure of the gas propellant in the accumulation chamber falls below a threshold amount.

7. The valve assembly as recited in claim 1, wherein the active chemical and gas propellant exit the dispenser as separate streams.

10 8. The valve assembly as recited in claim 1, wherein the accumulation chamber will at least partially exhaust the gas propellant when the diaphragm moves to the second configuration, and wherein the gas propellant and active chemical can mix in the valve assembly prior to exiting the valve assembly.

15 9. The valve assembly as recited in claim 1, wherein the active chemical is selected from the group consisting of insect repellents, insecticides, fragrances, sanitizers, and deodorizers.

10. A method of automatically delivering an active chemical from an aerosol container to an ambient environment at predetermined intervals, the method comprising the steps of:

20 (a) providing a valve assembly suitable for use to dispense a chemical from an aerosol container that has a first region with a gas propellant and a second region with an active chemical, the valve assembly being of the type that can automatically iterate between an accumulation phase where the gas propellant is received from the container, and a spray phase where the active chemical is automatically dispensed at intervals, the valve assembly comprising:

- 25 i. a housing mountable on an aerosol container;
- ii. a movable diaphragm associated with the housing and being biased towards a first configuration, wherein the diaphragm is linked to a stem to move therewith, wherein the stem carries a seal surface and defines a valve outlet, and wherein the seal surface prevents active chemical from flowing through the valve outlet when the diaphragm is in the first configuration;
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iii. an accumulation chamber inside the housing for providing variable pressure against the diaphragm;

iv. a first passageway in the housing suitable for linking the first region of the aerosol container with the accumulation chamber;

5 v. a second passageway linking the second region with the valve outlet, whereby when the pressure of gas propellant inside the accumulation chamber exceeds a specified threshold the diaphragm can move to a second configuration where the seal surface is translated to permit active chemical to spray from the valve assembly

10 (b) mounting the valve assembly to such an aerosol container; and
 (c) actuating the valve assembly.